Future Municipal Storm Water Systems

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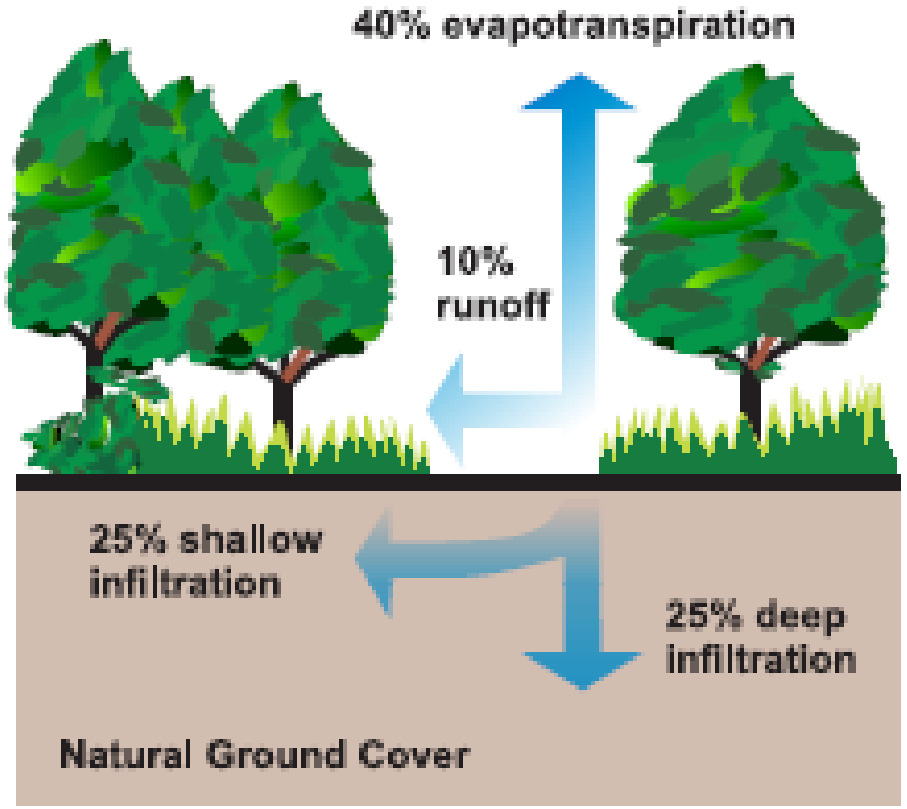
Post Construction

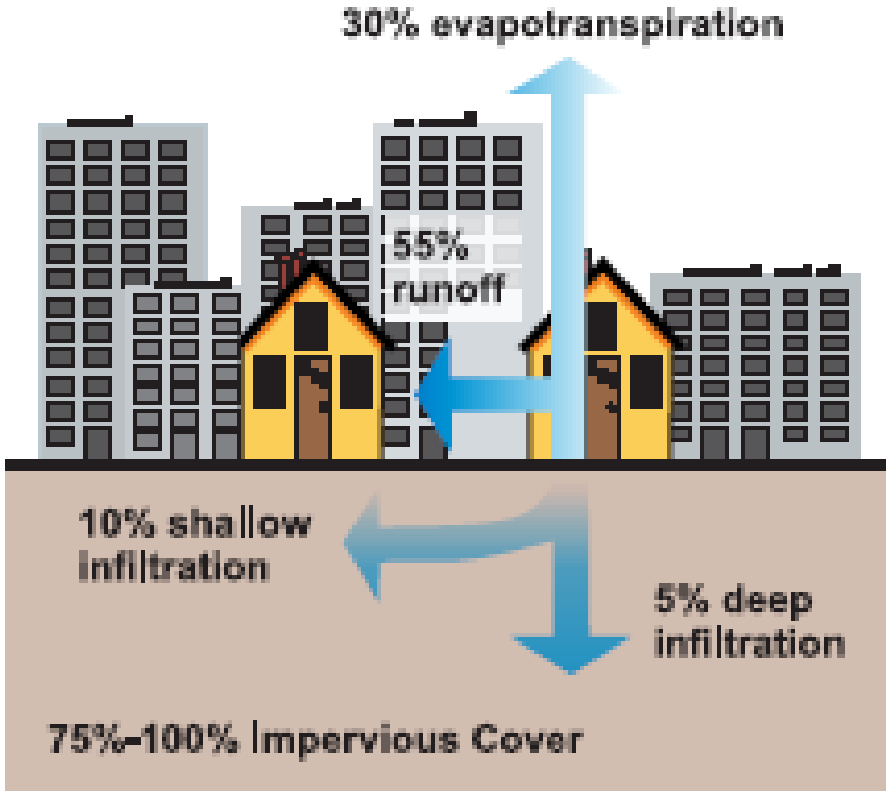
- 5th Min Control Measure (Long Term SW Management & Permanent SW Facilities)
- What may be coming? (New Rules?)

Pre/Post Development Hydrology

10% Surface Runoff

55% Surface Runoff

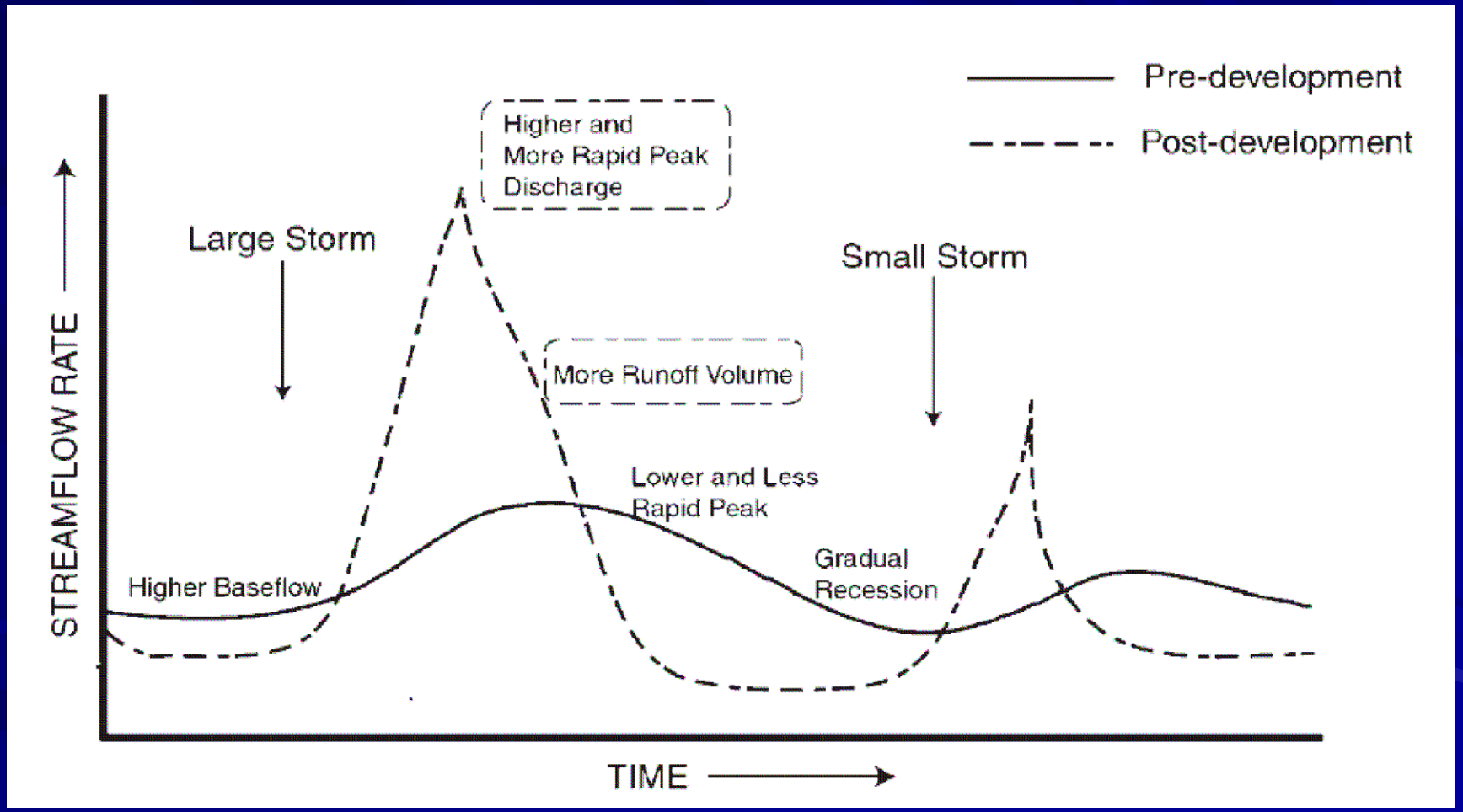




50% to Ground

15% to Ground

Pre/Post Development Flows



Hydrologic Changes from Development (Impervious Surface)

Volume of SW	→	Increased
Peak Flow	→	Increased
Pollution Loadings	→	Increased
Temperature	→	Increased
Duration of Flow	→	Increased

Changes in SW Strategy

- Predevelopment ~~Flow~~ → **Hydrology**!
  - Not just detention of storm surge
  - Volume of run off is a problem
  - MS4s are watersheds
  - SW system more than system of pipes, curb, inlets, and detention structures.

EPA Focus

- Infiltration
- Evapo-transpiration
- Rainwater Harvesting

Is harvesting rainwater legal in Utah?

- May 11, 2010 – SB 32 approved
- You must register on DNR website
  - http://www.waterrights.utah.gov/wrinfo/faq.asp
- Storage limited to 2 above ground 100 gal or 1 underground 2500 gal
- Use limited to the same parcel of land owned or leased by rainwater collector.

EPA Proposed Permit Requirements

- If disturbing 1 acre or more (& CPDS); must design, install, implement, and maintain SW control measures that infiltrate, evapo-transpirate, harvest SW.
- Post-construction hydrology will not exceed pre-development hydrology in accordance with performance standards.

SW STANDARDS
EPA Proposed Example #1

Basis: Rainfall

- Description: Minimum SW to be retained
- Performance Standard: The site must be designed to prevent offsite discharge of the first 1” of rainfall from a 24-hour period preceded by 48 hours of no precipitation.
  - Taken from West Virginia MS4 Permit

SW STANDARDS
EPA Proposed Example #2

Basis: Rainfall

- Description: Minimum storm size to be retained on site.
- Performance Standard: Design, construct, and maintain SW management practices so that rainfall events up to the 95th percentile do not discharge off the site. Employ SW management controls that effect infiltrate, evapo-transpire or harvest rainwater. The 95th percentile in SLC is 0.78" (SLC Airport, 1/1/80 to 1/1/10)
  - Section 438, EISA Guidance www.epa.gov/owow/NPS/lid/section438/pdf/finalsec438 eisa.pdf

95th Percentile Calculation

- 10 to 30 years of data (prefer 30)
- 24 hour day (12 midnight to 12 midnight)
- Delete all rainfall accumulations of 0.1” and less.
- Perform 95th percentile function on Excel (or list accordingly from greatest to smallest – find 0.95 from bottom)

95th Percentile

Atlanta, GA	1.8
Baltimore, MD	1.6
Boston, MA	1.5
Buffalo, NY	1.1
Burlington, VT	1.1
Charleston, WV	1.2
Coeur D'Alene, ID	0.7
Cincinnati, OH	1.5
Columbus, OH	1.3
Concord, NH	1.3
Denver, CO	1.1
Kansas City, MO	1.7
Knoxville, TN	1.5
Louisville, KY	1.5
Minneapolis, MN	1.4
New York, NY	1.7
Salt Lake City, UT	0.8
Phoenix, AZ	1.0
Portland, OR	1.0
Seattle, WA	1.6
Washington, DC	1.7

Percentiles for SLC Airport

95th	0.78”
90th	0.59”
85th	0.49”

SW STANDARDS
EPA Proposed Example #3

Basis: Recharge/Runoff

- Description: Hydrologic Analysis
- Performance Standard: Design, const, and maintain SW management practices that preserve the pre-development runoff conditions following const. The post-const rate, volume, duration, and temp of discharges must not exceed the pre-development rates and the pre-development hydrograph for 1, 2, 10, 25, 50, and 100 yr storms must be replicated through site design and other approp practices.

  Defensible and consistent hydrological assessments and modeling methods must be used and documented.

Section 438, EISA Guidance

SW STANDARDS
EPA Proposed Example #4

Basis: Recharge

- Description: Ground water recharge requirement
- Performance Standard: Any major development project that disturbs (? acreage), must comply with 1 of the 2 following GW recharge requirements.
  - Demonstrate w/ hydrologic and hydraulic analysis that the site maintains 100% of avg. annual pre-const GW recharge volume.
  - that the increase of SW discharge volume from pre- to post-construction for the 2-yr storm is infiltrated

SW STANDARDS
EPA Proposed Example #5

Basis: Impervious Cover

- Description: Limiting total impermeable surface or effective impermeable surface
- Performance Standard: Minimize total impervious cover resulting from new or redevelopment to <10% of disturbed land cover and/or limit total amount of effective impervious surface to no more than 5% of the landscape.

Incentives for New/Re Development

EPA Proposed

- A reduction of 0.2” of the 1” runoff reduction standard may be applied to any of the following types of development. Reductions are additive up to a maximum reduction of 0.75” for a project that meets four or more criteria. (1”, 0.2”, & 0.75” are suggested)
  - Redevelopment sites
  - Brownfield redeveloped sites
  - High density (>7 units per acre)
  - Vertical Density, (floor/area ratio of 2 or >18 units/acr
  - Mixed use and transit oriented (w/in ½ mi of transit)

Additional Requirements
EPA Proposed

- A site w/ reasonable potential for contamination of GW used for DW must provide treatment for associated pollutants.
- Discharges to any surface or GW that is used for drinking water must comply w/ source protection.
- Infiltration not allowed where soil contaminated
- Projects that cannot meet pre-development hydrology may do off-site mitigation or payment in lieu

EPA Rulemaking

- Proposed Rules Sept. 2011 (Maybe 12/2/2011)
- Final Rules Expected Nov. 2012
- Nation Wide SW Standards
- Possibly 90th percentile w/ calculator
  - Soil type
  - Groundwater level
  - Slope
  - Other
- If not 90th percentile then alternative treatment
- Reduced requirements for re-development

Any Questions?